

## Chapter 17. Storm Drainage

### 40:17-1. Scope & Purpose

#### 40:17-1-1. Policy Statement

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural Best Management Practices (BMPs). Structural BMPs should be integrated with nonstructural stormwater management strategies and proper maintenance plans. Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated quantity or amount of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

#### 40:17-1-2. Purpose

It is the purpose of this Section to establish minimum stormwater management requirements and controls for "major development," as defined in Section 40:15-7-2., and to set penalties for failure to comply with the requirements.

#### 40:17-1-3. Applicability

1. This Section shall be applicable to all site plans and subdivisions.
2. This Section shall also be applicable to all major developments undertaken by the City of Newark.
3. This Section shall also be applicable to all major developments undertaken by any government, government agency, special district, school district, Federal government or subdivision thereof, State government or subdivision thereof, County government or subdivision thereof and/or Special Bi-State Agencies.
  - a. Compatibility with Other Permit and Ordinance Requirements. Development approvals issued for subdivisions and site plans pursuant to this Section are to be considered an integral part of development approvals under the subdivision and site plan review

process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This Section is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, statute, or other provision of law except that, where any provision of this Section imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

### 40:17-2. Definitions Applicable Specifically to Section 40:17

Unless specifically defined below, words or phrases used in this Section shall be interpreted so as to give them the meaning they have in common usage and to give this Section its most reasonable application. The definitions below are the same as, or are based on, the corresponding definitions in NJAC 7:8-1.2 (Stormwater Management Rules). When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directive.

**Board** shall mean, where applicable, the Newark Central Planning Board or the Newark Zoning Board of Adjustment.

**Compaction** shall mean the increase in soil bulk density.

**Core** shall mean a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

**County review agency** shall mean an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The County review agency may either be a County

Planning Agency or a County water resource association created under NJSA 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinance.

**Department** shall mean the New Jersey Department of Environmental Protection.

**Design Engineer** shall mean a person professionally qualified and duly licensed in New Jersey to perform engineering or architecture services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

**Designated Center** shall mean a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

**Development** shall mean the division of a parcel of land into two (2) or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, NJSA 40:55D-1 et seq, including development by government agencies to which this Section applies.

**Drainage Area** shall mean a geographic area within which stormwater runoff, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

**Empowerment Neighborhood** shall mean a neighborhood designated by the Urban Coordinating Council "in consultation and conjunction with" the New Jersey Redevelopment Authority pursuant to NJSA 55:19-69.

**Environmentally Critical Areas** shall mean an area or feature which is of significant environmental value,

including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the NJDEP's Landscape Project as approved by the NJDEP's Endangered and Nongame Species Program.

**Erosion** shall mean the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

**Impervious Surface** shall mean a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

**Infiltration** shall mean the process by which water seeps into the soil from precipitation.

**Major Development** shall mean any "development" that provides for ultimately disturbing one-half (1/2) acre or more land. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

**Municipal Separate Storm Sewer System (MS4)** shall mean a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by the City of Newark, New Jersey or other public body, and is designed and used for collecting and conveying stormwater. MS4s do not include combined sewer systems, which are sewer systems that are designed to carry sanitary sewage at all times and to collect and transport stormwater from streets and other sources.

**Municipality** shall mean the City of Newark, New Jersey.

**NJDEP** shall mean the New Jersey Department of Environmental Protection.

**Node** shall mean an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

**Nutrient** shall mean a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

**Person** shall mean any individual, corporation, company, partnership, firm, association, or political subdivision of this State, and in particular the City of Newark, New Jersey, its Planning Board, Board of Adjustment, or Council when acting pursuant to the Municipal Land Use Law, NJSA 40:55D-1 et seq.

**Pollutant** shall mean any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, groundwaters or surface waters of the State, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

**Recharge** shall mean the amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

**Sediment** shall mean solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

**Sewer, Combined** shall mean a sewer system that takes sanitary waste and stormwater runoff in the same system.

**Sewer, Sanitary** shall mean a sewer system that takes only sanitary waste.

**Sewer, Stormwater** shall mean a sewer system that takes only stormwater runoff.

**Site** shall mean the lot or lots upon which a major development is to occur or has occurred.

**Soil** shall mean all unconsolidated mineral and organic material of any origin.

**State Development and Redevelopment Plan Metropolitan Planning Area (PA1)** shall mean an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the State's future redevelopment and revitalization efforts. Newark, New Jersey is a designated Center located in PA1.

**State Plan Policy Map** shall mean the geographic application of the State Development and Redevelopment Plan's goals and Statewide policies, and the official map of these goals and policies.

**Storm Drain Inlet** shall mean an opening in a storm drain used to collect stormwater runoff and includes, but is not limited to, a grate inlet, curb-opening inlet, slotted inlet, and combination inlet.

**Stormwater** shall mean water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

**Stormwater Management Basin** shall mean an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

**Stormwater Management Measure** shall mean any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

**Stormwater Runoff** shall mean water flow on the surface of the ground or in storm sewers, resulting from precipitation.

**Tidal Flood Hazard Area** shall mean a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

**Unimproved** shall mean land that has a preconstruction condition with good hydrologic condition.

**Urban Coordinating Council Empowerment Neighborhood** shall mean a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

**Urban Enterprise Zone** shall mean a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, NJSA 52:27H-60 et seq.

**Urban Redevelopment Area** is defined as previously developed portions of areas:

1. Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA<sub>1</sub>), Designated Centers, Cores or Nodes;
2. Designated as CAFRA Centers, Cores or Nodes;
3. Designated as Urban Enterprise Zones; and
4. Designated as Urban Coordinating Council Empowerment Neighborhoods.
5. Designated as a State Development and Redevelopment Plan Metropolitan Planning Area (PA<sub>1</sub>). Newark, New Jersey is a Designated Center and is entirely in PA<sub>1</sub>.

**Waters of the State** shall mean the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or groundwater, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

**Wetlands** or **Wetland** shall mean an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

#### **40:17-3. General Standards**

##### **40:17-3-1. Design & Performance Standards for Stormwater Management Measures**

1. Stormwater management measures for development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Section 40:17-4

of this Chapter. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.

2. The standards in this Section are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge.

3. No land area shall be developed by any applicant such that:
  - a. The volume and rate of stormwater runoff occurring from the property is increased over the volume and rate, which occurs under existing predevelopment conditions or preconstruction.
  - b. The drainage of the adjacent properties is adversely affected.
  - c. The existing drainage pattern of ditches, channels, and streams is not altered, nor their carrying capacities exceeded.
  - d. Stormwater runoff from impervious areas, such as parking lots, driveways or loading zones, flows over or across sidewalks, or out of driveways.

#### **40:17-4. Stormwater Management Requirements for Developments**

**40:17-4-1.** For the stormwater management measures incorporated into the design of a major development, all developments shall incorporate a maintenance plan in accordance with Section 40:17-10 of this Chapter.

**40:17-4-2.** Stormwater management measures shall avoid adverse impacts of concentrated flow on the storm or combined sewer system or habitat for threatened and endangered species as documented pursuant to the NJDEP's Landscape Project or Natural Heritage Database established under NJSA 13:1B-15.147 through 15.150.

**40:17-4-3.** The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff

quality requirements of Sections 40:17-4-6 and 40:17-4-7:

1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of fourteen (14) feet, provided that the access is made of permeable material.

**40:17-4-4.** A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 40:17-4-6 and 40:17-4-7 may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:

1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
2. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Sections 40:17-4-6 and 40:17-4-7 to the maximum extent practicable;
3. The applicant demonstrates that, in order to meet the requirements of Sections 40:17-4-6 and 40:17-4-7, existing structures currently in use, such as homes and buildings, would need to be condemned; and
4. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under Section 40:17-4-4(4) above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 40:17-4-6 and 40:17-4-7 that were not achievable on-site.

#### **40:17-4-5. Nonstructural Stormwater Management Strategies**

1. To the maximum extent practicable, the standards in Sections 40:17-4-6 and 40:17-4-7 shall be met by incorporating nonstructural stormwater management strategies set forth in this Section into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in paragraph (2) below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.
2. Nonstructural stormwater management strategies incorporated into site design shall:
  - a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
  - b. Minimize impervious surfaces and break up, disconnect the flow of runoff over impervious surfaces, and utilize velocity reduction strategies;
  - c. Maximize the protection of natural drainage features and vegetation;
  - d. Minimize the decrease in the "time of concentration" from pre-construction to post-construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed;
  - e. Minimize land disturbance including clearing and grading;
  - f. Minimize soil compaction;
  - g. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
  - h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas provided that the approving board deems this arrangement to be safe for the public

and that all safety regulations in Section 40:17-8 of this Chapter are met.

i. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff.

Such source controls include, but are not limited to:

i. Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 40:17-5(3) below;

ii. Site design features that help to prevent discharge of trash and debris from drainage systems;

iii. Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

iv. When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, NJSA 4:24-39 et seq., and implementing rules.

3. Site design features identified under Section 40:17-5(2)(i)(ii) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section 40:17-5(3)(c) below.

a. Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:

i. The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or

ii. A different grate, if each individual clear space

in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension. Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

b. Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.

c. This standard does not apply:

i. Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;

ii. Where flows from the water quality design storm as specified in Section 40:17-4-7(1) are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

- A. A rectangular space four and five-eighths ( $4 \frac{5}{8}$ ) inches long and one and one-half (1.5) inches wide (this option does not apply for outfall netting facilities); or
- B. A bar screen having a bar spacing of 0.5 inch.

iii. Where flows are conveyed through a trash rack that has parallel bars with one (1) inch spacing between the bars, to the elevation of the water quality design storm as specified in Section 40:17-4-7(1); or

iv. Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at NJAC 7:4-7.2(c), that action to meet this

standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

d. Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be found on the Department of Environmental Protection's Stormwater and Nonpoint Source Pollution website at [www.njstormwater.org](http://www.njstormwater.org).

#### **40:17-4-6. Erosion Control, Groundwater Recharge & Runoff Quantity Standards**

1. This paragraph contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.

a. The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, NJSA 4:24-39 et seq., as well as Title 28 of the Municipal Code (Soil Erosion and Sediment Control), and implementing rules.

b. The minimum design and performance standards for groundwater recharge are as follows:

i. No groundwater recharge is required for projects within the "urban redevelopment area," or at projects where stormwater is not permitted to be recharged as prescribed in Section 40:17-4-6(b)(ii) below. Newark is an "Urban Redevelopment Area."

ii. The following types of stormwater shall not be recharged:

A. Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.3 and listed in 40 CFR 302.4; areas where recharge would be inconsistent with NJDEP approved remedial action work plan or landfill closure

plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

B. Industrial stormwater exposed to "source material." "Source material" means any material(s) or machinery, located at an industrial facility, that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

iii. If stormwater recharge is desired and allowed, the following applies. The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 40:17-5, either:

A. Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain one hundred (100%) percent of the average annual pre-construction groundwater recharge volume for the site; or

B. Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.

iv. The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause superficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or down gradient of the groundwater recharge area.

c. For major developments, in order to control stormwater runoff quantity impacts, the design

engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 40:17-5, complete one of the following:

i. Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2-, 10-, and 100-year storm events do not exceed, at any point in time, the preconstruction runoff hydrographs for the same storm events;

ii. Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the 2-, 10-, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of future phases of the development project.

iii. Design of Stormwater Storage Facilities.

A. A minimum acceptable outlet pipe from all storage facilities shall be eight (8) inches internal diameter, and be of material and class as approved by Title VII, the State Uniform Construction Code as adopted by the City.

B. In the case of detention facilities utilizing porous media for ground absorption, such as dry-wells, porous pavement, or the like, the volume of porous media shall be large enough to contain the total volume of rainfall excess, as required under Section 40:17-3-1 of this Chapter, within the voids. Ground absorption systems shall be used only where the infiltration rate of the receiving soil is acceptable as determined by percolation tests and performed under the guidelines and standards of NJAC 7:9A et seq. (Environmental Protection), and soil borings, or as determined by the Director of Engineering. The applicant must demonstrate to the Director of Engineering that the soil contains no contaminants that could leave the site by use of a detention facility where ground absorption occurs. Provisions shall be made to contain overflow of such systems on site or to surface drain the overflow in such a way as not to adversely affect any other property.

C. If detention facilities utilizing surface impoundment, such as detention basins or rooftop storage, are used, sufficient volume to fully contain the total volume of rainfall excess shall be provided. The outlets of such facilities shall be designed to limit the maximum discharge rate of stormwater runoff to what occurs at the site under existing conditions and shall discharge in such a way as not to adversely affect any other property. If rooftop storage is proposed, the weight of the impounded water on the roof shall be accounted for in the structural design of the building and the roof shall be designed to provide maximum protection against leakage.

D. If a combination of different stormwater detention techniques is used, the combined volume of the systems shall be large enough to fully contain the total volume of rainfall excess.

E. Stormwater detention facilities shall be maintained regularly by the owner to insure continual functioning of the systems at design capacity and to prevent the health hazards associated with debris buildup and stagnant water. In no case shall water be allowed to remain in any facility long enough to constitute a mosquito breeding, disease or any other type of health problem.

F. Stormwater conduits shall be designed with full flow velocities ranging from a minimum of two and one-half (2.5) feet per second to a maximum of ten (10) feet per second.

G. All drainage and storage facilities shall be constructed to meet the requirements of the Director of Engineering.

H. All stormwater conduits must be connected to storm sewers or combined sewers wherever available, but in no case will stormwater conduits be connected to sanitary sewers. In the event that the municipal system is surcharged even after storage facilities are designed, the Director of Engineering shall direct the point of connection to the system or require such changes as are necessitated.



d. For Nonmajor Developments:

i. In order to accomplish the above objectives, the design of storm water drainage and storm water storage facilities may include (unless prohibited by Section 40:17-4-6(1)(b)(ii): roof-top storage, oversized sewers with restricted outlet pipes, underground storage tanks, French drains, or where acceptable soil and groundwater conditions exist planted swale areas, recharge basins, dry wells, porous pavement, or any other innovative techniques, or a combination of the above as approved by the Director of Engineering.

ii. Design of Stormwater Storage Facilities

A. On-tract stormwater facilities shall be designed to contain the amount of stormwater runoff, which is equal to the maximum difference in runoff between pre-development conditions and post development conditions.

B. Either the rational method or the soil conservation service method as outlined in the Soil Conservation Service National Engineering Handbook, Hydrology, shall be used for computing the volume and rate of runoff from existing and post development conditions.

C. The amount of runoff shall be compiled using a design storm with a ten (10) year return frequency for Essex County (See Graph on file in Office of City Clerk). The minimum initial time of concentration shall be ten (10) minutes.

D. For computation with the rational method, published runoff coefficients which reflect land use and topography shall be used. Acceptable runoff coefficients currently in practice include, but are not limited to the following:

TABLE 17-1. Land Use Types & Runoff Coefficients	
LAND USE TYPE	RUNOFF COEFFICIENTS
<b>Business</b>	
Central Business District	0.70 to 0.95
Neighborhood areas	0.50 to 0.70
<b>Residential</b>	
Single-family areas	0.30 to 0.50
Multi-units, detached	0.40 to 0.60
Multi-units, attached	0.60 to 0.75
Apartment dwelling areas	0.50 to 0.70
<b>Industrial</b>	
Light areas	0.50 to 0.80
Heavy areas	0.60 to 0.90
Parks, Cemeteries	0.10 to 0.25
Playgrounds	0.20 to 0.35
Railroad yard areas	0.20 to 0.40
Unimproved Areas	0.10 to 0.30
<b>SURFACE TYPE</b>	
<b>Streets</b>	
Asphaltic	0.70 to 0.95
Concrete	0.80 to 0.95
Brick	0.75 to 0.85
Drives and Walks	0.75 to 0.85
Roofs	0.75 to 0.85
<b>Lawns; Sandy Soil</b>	
Flat, 2%	0.05 to 0.10
Average, 2 to 7%	0.10 to 0.15
Steep, 7%	0.15 to 0.20
<b>Lawns; Heavy Soil</b>	
Flat, 2%	0.13 to 0.17
Average 2 to 7%	0.18 to 0.22
Steep, 7%	0.25 to 0.35

E. A minimum acceptable outlet pipe from all storage facilities shall be eight (8) inches internal diameter, and be of material and class as approved by Title VII, the State Uniform Construction Code as adopted by the City.

F. In the case of detention facilities utilizing porous media for ground absorption, such as dry-wells, porous pavement, or the like, the volume of porous media shall be large enough to contain

the total volume of rainfall excess, as required within the voids. Ground absorption systems shall be used only where the infiltration rate of the receiving soil is acceptable as determined by percolation tests and performed under the guidelines and standards of NJAC 7:9A et seq. [Environmental Protection], and soil borings, or as determined by the Director of Engineering. Provisions shall be made to contain overflow of such systems on site or to surface drain the overflow in such a way as not to adversely affect any other property.

G. If detention facilities utilizing surface impoundment, such as detention basins or rooftop storage, are used, sufficient volume to fully contain the total volume of rainfall excess shall be provided. The outlets of such facilities shall be designed to limit the maximum discharge rate of stormwater runoff to what occurs at the site under existing conditions and shall discharge in such a way as not to adversely affect any other property. If rooftop storage is proposed, the weight of the impounded water on the roof shall be accounted for in the structural design of the building and the roof shall be designed to provide maximum protection against leakage.

H. If a combination of different stormwater detention techniques is used, the combined volume of the systems shall be large enough to fully contain the total volume of rainfall excess.

I. Stormwater detention facilities shall be maintained regularly by the owner to insure continual functioning of the systems at design capacity and to prevent the health hazards associated with debris buildup and stagnant water. In no case shall water be allowed to remain in any facility long enough to constitute a mosquito breeding, disease or any other type of health problem.

J. Stormwater conduits shall be designed with full flow velocities ranging from a minimum of two and one-half (2.5) feet per second to a maximum of ten (10) feet per second.

K. All drainage and storage facilities shall be

constructed to meet the requirements of the Director of Engineering.

L. All stormwater conduits must be connected to storm sewers or combined sewers wherever available, but in no case will stormwater conduits be connected to sanitary sewers. In the event that the municipal system is surcharged even after storage facilities are designed, the Director of Engineering shall direct the point of connection to the system or require such changes as are necessitated.

e. In tidal flood hazard areas, stormwater runoff quantity analysis shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

#### **40:17-4-7. Stormwater Runoff Quality Standards for Major Developments That Do Not Discharge into Newark's Combined Sewer System**

1. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by eighty (80%) percent of the anticipated load from the developed site, expressed as an annual average. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination System (NJPDES) rules, NJAC 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is one and one-quarter (1.25) inches of rainfall in two (2) hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 17-2 (below). The calculation of the volume of runoff may take into account the

implementation of nonstructural and structural stormwater management measures.

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual, available online at [http://www.nj.gov/dep/stormwater/bmp\\_manual2.htm](http://www.nj.gov/dep/stormwater/bmp_manual2.htm). The BMP Manual may be obtained from the address identified in Section 40:17-7 or found on the Department of Environmental Protection’s Stormwater and Nonpoint Source Pollution website at [www.njstormwater.org](http://www.njstormwater.org). The BMP Manual and other sources of technical guidance are listed in Section 40:17-7. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the NJDEP at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418, Trenton, New Jersey, 08625-0418.

3. If more than one BMP in series is necessary to

achieve the required eighty (80%) percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (AXB)/100$$

Where

R = total TSS percent load removal from application of both BMPs, and

A = the TSS percent removal rate applicable to the first BMP

B = the TSS percent removal rate applicable to the second BMP

Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Section 40:17-6(3)
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

4. If there is more than one on-site drainage area, the eighty (80%) percent TSS removal rate shall apply to each drainage area, unless the runoff from the sub-areas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.

5. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Sections 40:17-4-6 and

40:17-4-7.

6. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 40:17-7 hereof.

7. In accordance with the definition of FW<sub>1</sub> at NJAC 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to fresh waters classified as FW<sub>1</sub>.

8. There are no Category One Rivers in Newark, but in the case that such a river is so designated, the following shall apply. Special water resource protection areas shall be established along all waters designated Category One at NJAC 7:9B-1.15(c) through (g), and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC<sub>14</sub> drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:

a. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:

i. A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.

ii. Encroachment within the designated special water resource protection area in the paragraph above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of

the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than one hundred fifty (150) feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the NJDEP.

b. All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the "Standards For Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, NJSA 4:24-39 et seq., as well as Title 28 of the Municipal Code (Soil Erosion and Sediment Control).

c. If stormwater, discharged outside of and flowing through the special water resource protection area, cannot comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, NJSA 4:24-39 et seq., as well as Title 28 of the Municipal Code (Soil Erosion and Sediment Control), then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

i. Stabilization measures shall not be placed within one hundred fifty (150) feet of the Category One waterway;

ii. Stormwater associated with discharges allowed by this Section shall achieve a ninety-five (95%) percent TSS post-construction removal rate;

iii. Temperature shall be addressed to ensure no impact on the receiving waterway;

iv. The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;

v. A conceptual project design meeting shall be held with the appropriate NJDEP staff and Soil Conservation District staff to identify necessary stabilization measures; and

vi. All encroachments proposed under this Section shall be subject to review and approval by the NJDEP.

d. A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Section 40:17-4-7(8) has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to Section 40:17-4-7(8) shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in Section 40:17-4-7(8)(a)(i) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than one hundred fifty (150) feet as measured perpendicular to the waterway subject to this Subsection.

**40:17-5. Calculation of Stormwater Runoff and Groundwater Recharge for Major Development**

**40:17-5-1.** Stormwater runoff shall be calculated in accordance with the following:

1. Design stormwater management measures so that the post-construction peak runoff rates for the 2-, 10- and 100-year storm events are 50, 75 and 80 percent, respectively, of the preconstruction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-construction stormwater runoff into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or

2. Computation and Design Standards:

a. For computation with the rational method, published runoff co-efficient which reflects land use and topography shall be used. Acceptable runoff co-efficient currently in practice includes, but are not limited to the following:

TABLE 17-4	
LAND USE TYPE	RUNOFF COEFFICIENT
<b>Business</b>	
Central Business District	0.70 to 0.95
Neighborhood areas	0.50 to 0.70
<b>Residential</b>	
Single-family areas	0.30 to 0.50
Multi-units, detached	0.40 to 0.60
Multi-units, attached	0.60 to 0.75
Apartment dwelling areas	0.50 to 0.70
<b>Industrial</b>	
Light areas	0.50 to 0.80
Heavy areas	0.60 to 0.90
<b>Parks, Cemeteries</b>	0.10 to 0.25
<b>Playgrounds</b>	0.20 to 0.35
<b>Railroad yard areas</b>	0.20 to 0.40
<b>Unimproved Areas</b>	0.10 to 0.30

TABLE 17-5	
SURFACE TYPE	RUNOFF COEFFICIENT
<b>Streets</b>	
Asphaltic	0.70 to 0.95
Concrete	0.80 to 0.95
Brick	0.75 to 0.85
Drives & Walks	0.75 to 0.85
<b>Roofs</b>	0.75 to 0.85
<b>Lawns; Sandy Soil</b>	
Flat, 2%	0.05 to 0.10
Average, 2 to 7%	0.10 to 0.15
Steep, 7%	0.15 to 0.20
<b>Lawns; Heavy Soil</b>	
Flat, 2%	0.13 to 0.17
Average 2 to 7%	0.18 to 0.22
Steep, 7%	0.25 to 0.35

b. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds; or the Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

3. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the preconstruction condition of a site or portion thereof is unimproved land with good hydrologic condition. The term “runoff coefficient” applies to both the NRCS methodology in Table 17-1 and the Rational and Modified Rational Methods at Section 40:17-5-1(2) (b). In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is lawn, or park), with good cover or with good hydrologic condition and conservation treatment.

4. In computing preconstruction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts that may reduce pre-construction stormwater runoff rates and volumes.

5. In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 – Urban Hydrology for Small Watersheds and other methods may be employed.

6. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at NJAC 7:13 (Flood Hazard Control Area Act Rules), the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

**40:17-5-2.** Groundwater recharge may be calculated in accordance with the following:

1. The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; available online at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427, Trenton, New Jersey 08625-0427.

#### **40:17-6. Standards for Structural Stormwater Management Measures**

1. Standards for structural stormwater management measures are as follows:

a. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).

b. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1”) spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section 40:17-8-2

i. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant.

ii. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half (2.5) inches in diameter.

iii. Stormwater management basins shall be

designed to meet the minimum safety standards for stormwater management basins at Section 40:17-8-2.

2. Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual online at [http://www.nj.gov/dep/stormwater/bmp\\_manual2.htm](http://www.nj.gov/dep/stormwater/bmp_manual2.htm). Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Section 40:17-4 of this Section.

3. Manufactured treatment devices may be used to meet the requirements of Section 40:17-4 of this Section, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the NJDEP.

#### **40:17-7. Sources for Technical Guidance**

**40:17-7-1.** Technical guidance for stormwater management measures can be found in the documents listed at paragraphs (a) and (b) below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625.

1. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, available online at [http://www.nj.gov/dep/stormwater/bmp\\_manual2.htm](http://www.nj.gov/dep/stormwater/bmp_manual2.htm), as amended. Information is provided on stormwater management measures such as: bioretention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.

2. The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.

**40:17-7-2.** Additional technical guidance for stormwater management measures can be obtained from the following:

1. The "Standards for Soil Erosion and Sediment

Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into NJAC 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in NJAC 2:90-1.3(a)3. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625;

2. The Rutgers Cooperative Extension Service, and

3. The Soil Conservation Districts listed in NJAC 2:90-1.3(a)3. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625.

#### **40:17-8. Safety Standards for Stormwater Management Basins**

**40:17-8-1.** This Section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This Section applies to any new stormwater management basin.

#### **40:17-8-2. Requirements for Trash Racks, Overflow Grates and Escape Provisions**

1. A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:

a. The trash rack shall have parallel bars, with no greater than six (6) inch spacing between the bars.

b. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.

c. The average velocity of flow through a clean trash rack is not to exceed two and one-half (2.5) feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.

d. The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading

of three hundred (300) pounds per square feet.

2. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:

a. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance;

b. The overflow grate spacing shall be no less than two (2) inches across the smallest dimension;

c. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of three hundred (300) pounds per square feet.

3. For purposes of this paragraph, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:

a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 40:17-8-3 a freestanding outlet structure may be exempted from this requirement.

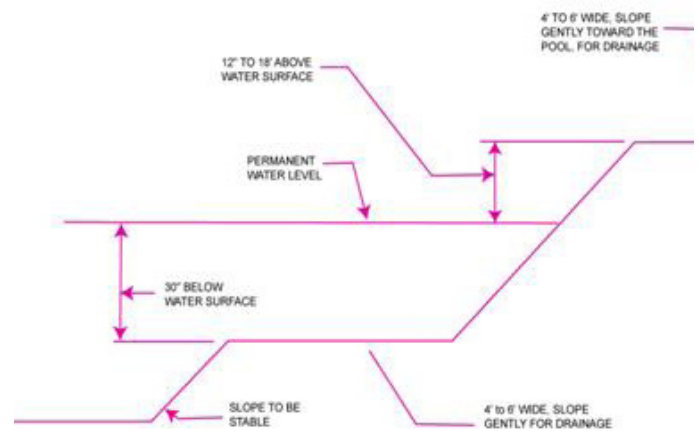
b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half (2.5) feet. Such safety ledges shall be comprised of two (2) steps. Each step shall be four (4) to six (6) feet in width. One step shall be located approximately two and one-half (2.5) feet below the permanent water surface, and the second step shall be located one (1) to one and one-half (1.5) feet above the permanent water surface. See Section 40:17-8-3 for an illustration of safety ledges in a stormwater management basin.

c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

### 40:17-8-3. Variance or Exemption from Safety Standards

1. A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency of the City of Newark that the variance or exemption will not constitute a threat to public safety.

Depicted is an elevational view.



### 40:17-9 Additional Requirements for a Site Development Stormwater Plan to be Added to a Site Plan Review Application for Developments

#### 40:17-9-1. Submission of Site Development Stormwater Plan for Major Development

1. Whenever an applicant seeks municipal approval of a development subject to this Section, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Section 40:17-9-3 as part of the submission of the applicant's application for subdivision or site plan approval.

2. The applicant shall demonstrate that the project meets the standards set forth in this Section.

3. The applicant shall submit eight (8) copies of the materials required by the reviewing board and listed in the checklist for site development stormwater plans in accordance with Section 40:17-9-3.

#### 40:17-9-2. Site Development Stormwater Plan



## Approval

The applicant's site development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from whom municipal approval is sought. That municipal board's staff shall consult the Engineering Department and Department of Water and Sewer Utilities to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this Section.

### 40:17-9-3. Checklist Requirements

The following information shall be required:

1. Topographic Base Map. The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of two hundred (200) feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing manmade structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

2. Environmental Site Analysis. A written and graphic description of the natural and manmade features of the site and its environs. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.

3. Project Description and Site Plan(s). A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground water

elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

4. Land Use Planning and Source Control Plan. This plan shall provide a demonstration of how the goals and standards of Sections 40:17-2 through 40:17-5 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5. Stormwater Management Facilities Map. The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

a. Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.

b. Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

6. Calculations

a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 40:17-4.

b. When the proposed storm-water management control measures (e.g., infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

7. Maintenance and Repair Plan. The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 40:17-10.

8. Waiver from Submission Requirements. The municipal official or board reviewing an application under this Section may, in consultation with the Departments of Engineering and Water and Sewer Utilities, waive submission of any of the requirements in Sections 40:17-9-3(1) through 40:17-9-3(5) of this Section when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process and such waiver would not be a violation of NJDEP Rules and Regulations.

#### **40:17-10. Maintenance & Repair**

##### **40:17-10-1. Applicability**

1. Projects subject to review shall comply with the requirements of Sections 40:17-10-2 and 40:17-11.

##### **40:17-10-2. General Maintenance**

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.
2. The maintenance plan shall contain specific preventative maintenance tasks and schedules.
3. The maintenance plan for major developments shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual, available online at [http://www.nj.gov/dep/stormwater/bmp\\_manual2.htm](http://www.nj.gov/dep/stormwater/bmp_manual2.htm). If the maintenance plan identifies a person other than the developer (for example, a property owner or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable section or regulation.
4. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project,

unless such owner or tenant owns or leases the entire residential development or project. Under no circumstances shall the responsibility for maintenance be assigned, designated, assumed or transferred to the City of Newark unless the development is undertaken by the City.

5. The maintenance plan shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
6. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.
7. For major development projects, the person responsible for maintenance identified under Section 40:17-10-2(3) above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.
8. For major development projects, the person responsible for maintenance identified under Section 40:17-10-2(3) above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
9. The person responsible for maintenance identified under Section 40:17-10-2(3) above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Sections 40:17-10-2(7) and 40:17-10-2(8) above.
10. The requirements of Sections 40:17-10-2(3) and 40:17-10-2(4) do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.
11. In the event that the stormwater management

facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the City of Newark shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the Departments of Engineering and Water and Sewer Utilities. The City of Newark, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the City of Newark may immediately proceed to do so and shall impose a lien or use other remedies to collect the cost thereof from the responsible person.

For major development projects, nothing in this Section shall preclude the City of Newark in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with NJSA 40:55D-53.

#### **40:17-11. Refuse Containers/Dumpsters**

**40:17-11-1.** All dumpsters and other refuse containers that are outdoors or exposed to stormwater must be covered at all times and prohibited from spilling, dumping, leaking, or otherwise discharge of liquids, semi-liquids or solids from the containers to the municipal separate storm sewer system(s) operated by the City of Newark, New Jersey and/or the waters of the State so as to protect public health, safety and welfare.

#### **40:17-11-2. Prohibited Conduct**

1. Any person who controls, whether owned, leased, or operated, a refuse container or dumpster must ensure that such container or dumpster is covered at all times and shall prevent refuse from spilling out or overflowing.

2. Any person who owns, leases or otherwise uses a refuse container or dumpster must ensure that such container or dumpster does not leak or otherwise discharge liquids, semi-liquids or solids to the municipal separate storm sewer system operated by the City of Newark, New Jersey.

#### **40:17-11-3. Exceptions to Prohibition**

1. Permitted temporary demolition containers.

2. Litter receptacles (other than dumpsters or other bulk containers).

3. Individual homeowner trash and recycling containers.

4. Refuse containers at facilities authorized to discharge stormwater under a valid NJPDES permit.

5. Large bulky items (e.g., furniture, bound carpet and padding, white goods, such as refrigerator, dishwasher, freezer, washer and dryer, placed curbside for pickup).

#### **40:17-12. Private Storm Drain Inlet Retrofitting**

**40:17-12-1.** Existing storm drain inlets which are in direct contact with repaving, repairing, reconstruction, or resurfacing or alterations of facilities on private property must be retrofitted to prevent the discharge of solids and floatables (such as plastic bottles, cans, food wrappers and other litter) to the municipal separate storm or combined sewer system operated by the City of Newark, New Jersey so as to protect public health, safety and welfare.

1. Prohibited Conduct. No person in control of private property (except a residential lot with one single-family house) shall authorize the repaving, repairing (excluding the repair of individual potholes), resurfacing (including top coating or chip sealing with asphalt emulsion or a thin base of hot bitumen), reconstructing or altering any surface that is in direct contact with an existing storm drain inlet on that property unless the storm drain inlet either:

a. Already meets the design standard below to control passage of solid and floatable materials; or

b. Is retrofitted or replaced to meet the standard in paragraph 2. below prior to the completion of the project.

#### **40:17-12-2. Design Standard**

Storm drain identified in Section 40:17-12 above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section 40:17-12-2(3) below.

1. Design engineers shall use either of the following grates whenever they use a grate in pavement or

another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:

a. The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or

b. A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension. Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

2. Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.

3. This standard does not apply:

a. Where the Municipal Engineer agrees that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards:

i. Where flows are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

ii. A rectangular space four and five-eighths (4 5/8) inches long and one and one-half (1 1/2) inches wide (this option does not apply for outfall netting facilities); or

iii. A bar screen having a bar spacing of 0.5 inches.

4. Where flows are conveyed through a trash rack that has parallel bars with one (1) inch spacing between the bars; or

5. Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at NJAC 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

#### **40:17-13. Penalties**

**40:17-13-1.** Any person(s) found to be in violation of the provisions of the City of Newark Stormwater Control Ordinance or who willfully or negligently fail(s) to comply with the rules and regulations noted herein above shall be subject to a fine as follows:

1. Fine related to paragraphs a. through j., a fine of not more than one thousand (\$1,000.00) dollars or imprisonment not to exceed ninety (90) days, or both, for each offense;

2. Fine related to paragraph k., a fine not to exceed one hundred thousand (\$100,000.00) dollars;

3. Fine related to paragraph l., a fine not to exceed ten thousand (\$10,000.00) dollars for each storm drain inlet that is not retrofitted to meet the design standard.

a. Each day on which a violation shall occur or continue shall be deemed a separate and distinct offense. In addition to the penalties provided herein, the City of Newark may recover reasonable attorneys' fees, court costs, court reporters' fees and other expenses of litigation by appropriate suit at law against the person(s) found to have violated the regulations issued recited herein above.

#### **40:17-14. Enforcement**

This Section shall be enforced by the Police Department, Department of Neighborhood and Recreational Services and/or other Municipal Officials of the City of Newark, New Jersey.